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A LIQUID DETERGENT COMPOSITION

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Constitution

A liquid detergent composition, comprising the following ingredients (a) to (e):

(a) A surfactant selected from a group consisting of anionic surfactants, amphoteric surfactants, nonionic surfactants and mixtures thereof (2-50 wt%).

(b) A silicone oil with a specific weight of less than 1.0 (0.01-10 wt%).

(c) Water-insoluble microparticles with a specific weight of at least 1.0 and a particle size of 0.01-100 μm (0.01-10 wt%).

(d) A cationic polymer (0.01-10 wt%).

(e) Water [balance].

Effects

According to the detergent composition of the present invention, silicone oil and microparticles, which are insoluble in water and exhibit a large difference in their specific weights, are dispersed in a stable manner, and excellent conditioning effects can be achieved.

Claim

A liquid detergent composition, characterized by the fact of comprising the following ingredients (a) to (e):

(a) a surfactant selected from a group consisting of anionic surfactants, amphoteric surfactants, nonionic surfactants and mixtures thereof (2-50 wt%);

(b) a silicone oil with a specific weight of less than 1.0 (0.01-10 wt%);

(c) water-insoluble microparticles with a specific weight of at least 1.0 and a particle size of 0.01-100 μm (0.01-10 wt%);

(d) a cationic polymer (0.01-10 wt%);

(e) water.

Detailed explanation of the invention

[0001]

Industrial application field

The present invention concerns a liquid detergent composition. In more detail, the present invention concerns a shampoo composition that comprises a water-insoluble silicone and water-insoluble microparticles present in a stable state, and possesses excellent conditioning effects.

[0002]

Prior art

It is a conventional practice that hair care products, such as shampoos, are compounded with silicone oil to enhance the feel of the hair (see specifications of U.S. Patent Nos. 2,826,551 and 3,964,500, as well as Japanese Kokai Patent Application Nos. Sho 49[1974]-111906, Sho 57[1982]-112319, and Sho 58[1983]-74798).

[0003]

Additionally, it is also a conventional practice to compound a shampoo or the like with appearance enhancers, such as mica and titanium dioxide, pigments, and microparticles such as antifungal agents and bactericides (e.g., zinc pyrithione, selenium disulfide, and sulfur).

[0004]

Problems to be solved by the invention

However, compounding shampoos and the like with these microparticles is problematic in that the use of these conventional shampoos gives rise to a microparticle residual feel and squeaky feel after use, so an excellent feel cannot be obtained. Consequently, it is expected that a microparticle residual feel and squeaky feel can be inhibited and excellent conditioning effects can be obtained by compounding a shampoo

composition with a silicone oil in conjunction with these microparticles. However, the above-mentioned silicone oil and microparticles are essentially insoluble in water. Additionally, since their specific weights are significantly different, these two ingredients, when compounded in a shampoo composition, often lead to sedimentation and separation over time. Other problems include the fact that it is difficult to obtain a stable dispersion system and that the desired conditioning effects also cannot be obtained.

[0005]

Accordingly, the objective of the present invention is to offer a shampoo composition in which silicone oil and microparticles, which are both insoluble in water, are dispersed in a stable manner.

[0006]

Means to solve the problem

In light of these issues, the present inventors conducted repeated diligent research; as a result, they arrived at the present invention after discovering that silicone oil and microparticles can be dispersed in a stable manner and that a shampoo composition with excellent conditioning effects can be obtained by compounding the shampoo composition with a cationic polymer.

[0007]

Specifically, the present invention concerns a liquid detergent composition, characterized by the fact of comprising the following ingredients (a) to (e):

(a) A surfactant selected from a group consisting of anionic surfactants, amphoteric surfactants, nonionic surfactants and mixtures thereof (2-50 wt%).

(b) A silicone oil with a specific weight of less than 1.0 (0.01-10 wt%).

(c) Water-insoluble microparticles with a specific weight of at least 1.0 and a particle size of 0.01-100 μm (0.01-10 wt%).

(d) A cationic polymer (0.01-10 wt%).

(e) Water.

[0008]

Among the surfactants of ingredient (a) used in the present invention, examples of anionic surfactants include alkyl sulfates, alkyl ether sulfates, fatty acid soaps, ether carboxylic acids and their salts, alkanesulfonates, α-olefin sulfonates, sulfonates of higher fatty acids, dialkyl sulfosuccinates, monoalkyl sulfosuccinates, poly(oxyethylene) monoalkyl sulfosuccinates, sulfonates of higher fatty amides, sulfates of glycerin fatty esters, sulfates of higher fatty acid alkylolamides and acylated amino acid salts, examples of amphoteric surfactants include imidazoline-type surfactants, amide amino acid salts, carbobetaine-type surfactants, alkylbetaine-type surfactants, alkylamide betaine-type surfactants, and alkylsulfobetaine-type surfactants, and examples

of nonionic surfactants include monoglycerides, sorbitan fatty esters, sucrose fatty esters, polyglycerin fatty esters, alkanolamides, amine oxides, poly(oxyethylene) alkyl ethers, poly(ethylene glycol) fatty esters, poly(oxyethylene) sorbitan fatty esters, poly(oxyethylene) poly(oxypropylene) block copolymers, poly(oxyethylene) glycerin monofatty esters, poly(oxyethylene propylene) glycol monofatty esters, poly(oxyethylene) hardened castor oils, poly(oxyethylene) fatty amides, poly(oxyethylene) alkylamines, and alkyl saccharides.

[0009]

One or a combination of two or more of these surfactants of ingredient (a) can be used. The compounding amount is 2-50 wt% in the detergent composition of the present invention, with 5-30 wt% being preferred.

[0010]

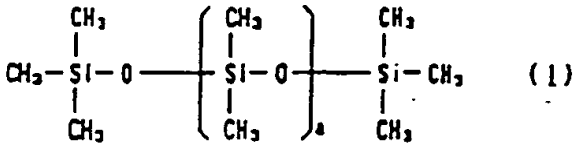
Examples of a silicone oil with a specific weight of less than 1.0 of ingredient (b) used in the present invention include the following compounds.

[0011]

(A) Dimethylpolysiloxane as represented by formula (1)

[0012]

[Structure 1]



(1)

[0013]

(in this formula, "a" indicates an integer of at least 3).

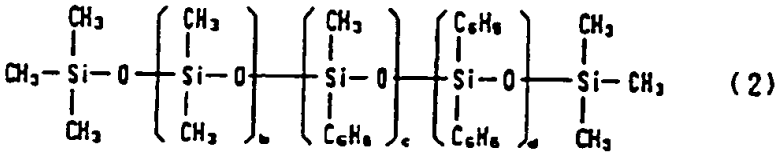
For example, the commercial product under the trade name of KF96 from Shin-Etsu Kagaku Inc. and the like can be used as the dimethylpolysiloxane represented by general formula (1).

[0014]

(B) Methylphenylpolysiloxane as represented by formula (2)

[0015]

[Structure 2]



(2)

[0016]

(in this formula, "b", "c", and "d" each indicate a number, with the sum of these numbers being at least 1; however, "d" is not 0 when "c" is 0, and "c" is not 0 when "d" is 0).

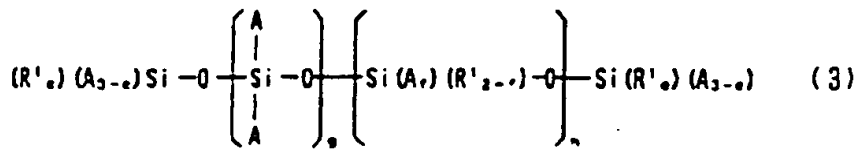
The methylphenylpolysiloxane as represented by general formula (2) is also widely known. For example, the commercial products under the trade name of KF50 and the like from Shin-Etsu Kagaku, Inc. can be used.

[0017]

(C) Amino-modified silicones as represented by formula (3)

[0018]

[Structure 3]



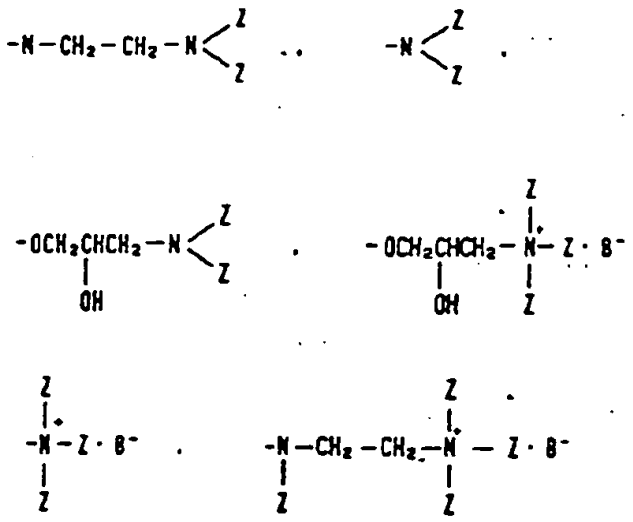
[0019]

(in this formula, "A" is selected from a group consisting of a hydrogen atom, phenyl group, hydroxyl group, and C1-C8 alkyl groups, "e" indicates an integer of 0-3, "f" indicates 0 or 1,

"g" indicates an integer of 0-1999, "h" indicates an integer of 1-2000, "g" + "h" indicates an integer of 1-2000, R^1 indicates a group $-C_iH_{2i}L$ (here, "i" is an integer of 2-8), and "L" is selected from the following formulas).

[0020]

[Structure 4]



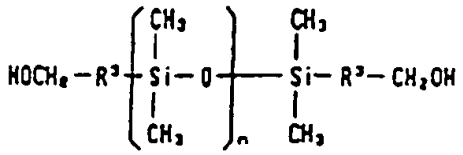
[0021]

(in these formulas, "Z" is selected from a group consisting of hydrogen atom, phenyl group, benzyl group, and C1-C20 alkyl groups, and "B^-" indicates Cl^-, Br^- I^-, or F^-).

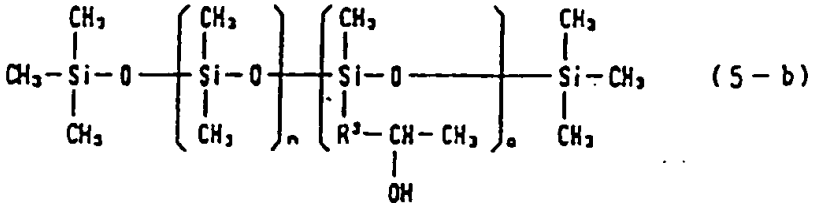
The commercial products under the trade names SF8417, DC536 and the like from Toray Dow Corning Silicone, Inc. and the aminoalkyl silicone emulsion SM8702C (Toray Dow Corning Silicone,

[0026]

[Structure 6]



(5-a)



(5-b)

[0027]

(in these formulas, "n" and "o" each indicate a number of 1-500 with 1-200 being preferred, and R^3 indicates a single bond or C1-C4 alkylene).

[0028]

(F) Aliphatic alcohol-modified silicones as represented by formula (6)

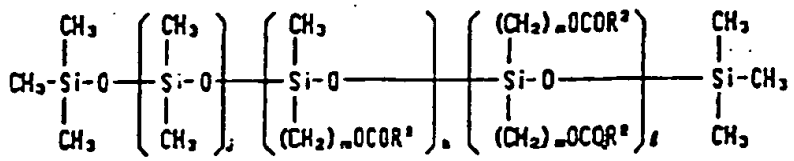
Inc.) can be used as the amino-modified silicone represented by general formula (a) [sic; 3].

[0022]

(D) Fatty-acid-modified polysiloxane as represented by formula (4) [sic; 5]

[0023]

[Structure 5]



[0024]

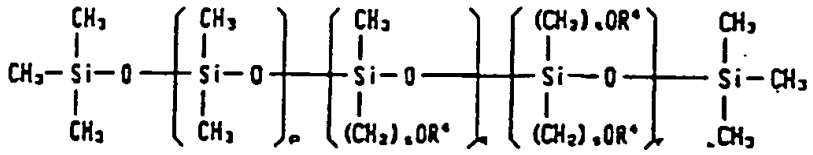
(in this formula, "j", "k" and "l" each indicate a number of 1-350, "m" indicates a number of 0-10, and R^2 indicates a C9-C21 alkyl group).

[0025]

(E) Alcohol-modified silicones as represented by formula (5-a) and formula (5-b)

[0029]

[Structure 7]



[0030]

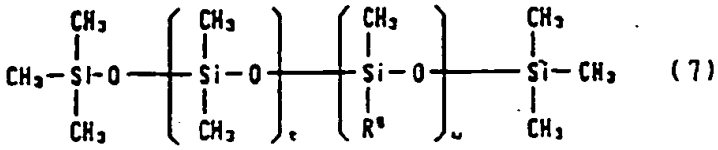
(in this formula, "p", "q", and "r" each indicate a number with the sum thereof being 1-300, "s" indicates a number of 0-5, and R^4 indicates a C4-C22 alkyl group).

[0031]

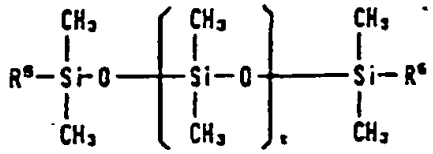
(G) Polyether-modified silicones as represented by formulas (7) to (10)

[0032]

[Structure 8]



(7)



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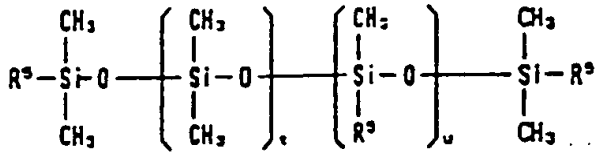
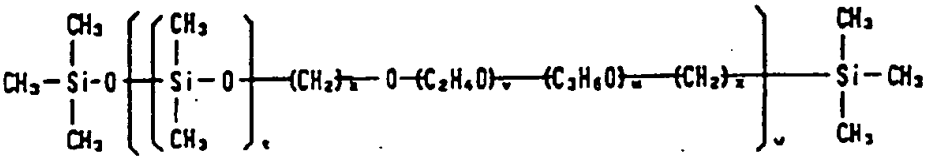


(9)



(10)

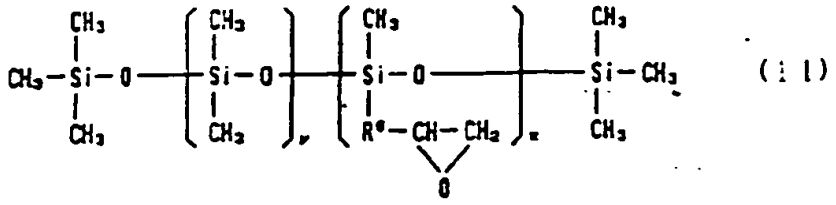
(here, R^5 represents $-(CH_2)x-O-(C_2H_4O)v-(C_3H_6O)w-D$, "D" represents a C1-C12 alkyl group or a hydrogen atom, "t" represents 1-2000, "u" represents 1-1000, "v" represents 0-50, "w" represents 0-50 ($v + w \geq 1$), and "x" represents 0-10.

[0033]

(H) Epoxy-modified silicones as represented by formula (11)

[0034]

[Structure 9]



(11)

[0035]

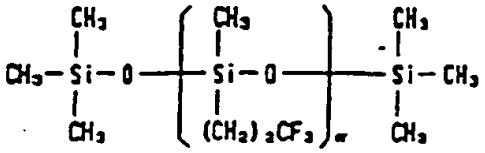
(in this formula, "y" indicates a number of 1-500, with 1-250 being preferred, "z" indicates a number of 1-50, with 1-30 being preferred, and R^6 indicates a C1-C3 alkylene group).

[0036]

(I) Fluorinated silicones as represented by formula (12)

[0037]

[Structure 10]



(12)

[0038]

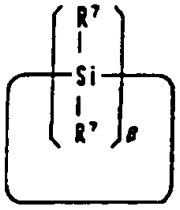
(in this formula, "α" indicates a number of 1-400, with 1-250 being preferred).

[0039]

(J) Cyclic silicones as represented by formula (13)

[0040]

[Structure 11]



(13)

[0041]

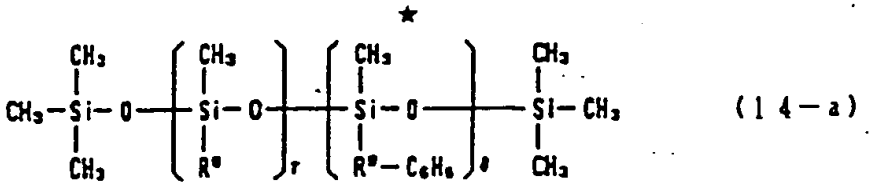
(in this formula, "β" indicates a number of 3-8, and R^7 indicates a C1-C3 alkyl group).

[0042]

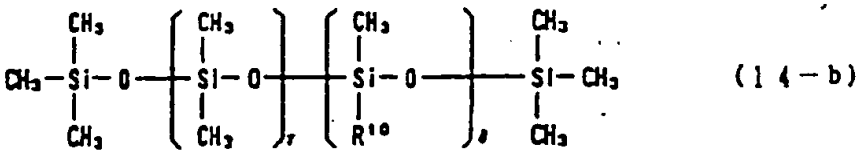
(K) Alkyl-modified silicones as represented by formula (14-a) and formula (14-b)

[0043]

[Structure 12]



(14-a)



(14-b)

[0044]

(in these formulas, "γ" and "δ" each indicate a number of 1-500 with 1-200 being preferred, R^8 indicates a C2-C18 alkyl group, R^9 indicates a single bond or a C1-C4 alkylene group, and R^{10} indicates a C10-C16 alkyl group).

[0045]

One or a combination of two or more of these silicone oils of ingredient (b) can be used. The compounding amount is 0.01-10

wt% in the detergent composition of the present invention, with 0.1-5 wt% being preferred.

[0046]

There is no particular limitation concerning the water-insoluble microparticles with a specific weight of at least 1.0 and a particle size of 0.01-100 μm of ingredient (c) used in the present invention, within the confine that the material used is quite insoluble in water and can be dispersed. For examples, organic macromolecular compounds, silicone resins, clay minerals, organic multivalent metal salts, and the like can be used.

[0047]

Examples of organic macromolecular compounds include nylon, polyethylene, polyester, polypropylene, polystyrene, polyurethane, polyamide, epoxy resins, urea resins and acrylic polymers. Copolymers and macromolecular compounds with a crosslinked structure can also be used. Among these materials, polymer latex synthesized by emulsion polymerization is typically preferred.

[0048]

Examples of silicone resins include a commercial product under the trade name "Trispearl" from Toshiba Silicone, Inc.

[0049]

Examples of clay minerals include talc, kaolin, mica, sericite, and bentonite.

[0050]

Examples of organic multivalent metal salts include 2-mercaptopyridine multivalent metal salts and selenium disulfide. In particular, 2-mercaptopyridine zinc salt (zinc pyrithione) is preferred. When 2-mercaptopyridine zinc salt is used, it is particularly preferred that microparticles thereof be used (average particle size of 0.2 μm or less with at least 50 wt% being those with a particle size of 0.2 μm or less; described in Japanese Kokai Patent Application Nos. Sho 60[1985]-16972, Sho 60[1985]-16973, and Sho 60[1985]-224676).

[0051]

Among these compounds, silicone resins and organic multivalent metal salts are preferred, particularly organic multivalent metal salts. Also, one or a combination of two or more of these water-insoluble microparticles of ingredient (c) can be used. The compounding amount is 0.01-10 wt% in the detergent composition of the present invention, with 0.1-3 wt% being preferred.

Examples of these optional ingredients include solubilizing agents (e.g., propylene glycol and glycerin), pearl-essence agents (e.g., ethylene glycol distearate), viscosity-adjusting agents (e.g., ethyl alcohol, isopropyl alcohol, hydroxyethylcellulose, methylcellulose and higher alcohols), antilipid deprivation agents, antibiotics, keratin solubilizing agents and keratin softening agents (e.g., sulfur, salicylic acid, and enzymes), deodorizers, lotioning agents, fragrance, dyes, ultraviolet-light absorbing agents, antioxidants, and preservatives.

[0055]

The detergent composition of the present invention can be manufactured by a typical method that involves, for example, uniformly mixing the above-mentioned ingredients. A viscosity of at least 1000 cp (30°C) is preferred.

[0056]

Application examples

The present invention is described in more detail by means of application examples. However, the present invention is not limited to these only these.

[0052]

Examples of the cationic polymer of ingredient (d) used in the present invention include cationated cellulose derivatives (e.g., Polymer LR400, Polymer JR400, and Quatrisoft Polymer LM 200 made by Union Carbide, Inc. and Celquat L200 made by National Starch Inc.), cationated starch, cationated dextran, cationated guaiac gum (e.g., JAGUR C13S made by Meihol Chemicals, Inc.), chitin/chitosan, quaternary poly(vinylpyrrolidone) (e.g., Gafquat 734, 755 and 755N made by GAF, Inc.), diacyl quaternary ammonium salt homopolymers, diacyl quaternary ammonium salt/acrylamide copolymers (Merquat 100 and 550 made by Merck Inc.), polyglycol polyamine condensation products (e.g., Polycoat H81 and NH made by Henkel, Inc.), adipic acid/dimethylaminohydroxypropyl ethylenetriamine copolymers (e.g., Cartaretin made by Sand Inc.), and cationated protein (e.g., cationic gelatin and cationic collagen).

[0053]

One or a combination of two or more of these cationic polymers of ingredient (d) can be used. The compounding amount is 0.01-10 wt% in the detergent composition of the present invention, with 0.05-5 wt% being preferred.

[0054]

Additionally, besides the above-mentioned required ingredients, the detergent composition of the present invention can also be compounded with any typical compounding ingredient.

Application Example 1

A shampoo was prepared by uniformly mixing the ingredients shown in Table I, and the conditioning effect and stability of the resulting shampoo were evaluated.

Conditioning effect: A bundle of false hair [wig] (20 g and 15 cm) was shampooed using the shampoo prepared, and the quality and fullness of the hair after drying were evaluated by a panel of five specialists in accordance with the following standards.

"O": Excellent; "Δ": Good; "X": Poor

Stability: The shampoos prepared were stored for 20 days at 50°C, and their appearances were observed visually and evaluated in accordance with the following standards.

"O": No abnormality; "Δ": Moderately separated; "X": Separated

[0057]

Table I

(1) 成分	(8) 実施例 1	(9) 比較例 1	比較例 2
ポリオキシエチレン(3E.O.)ラウリル硫酸ナトリウム (2)	18	18	18
ヤシ油脂肪酸ジエタノールアミド (3)	3	3	3
ジメチルポリシロキサン(10万cs) (4)	3	3	−
ジンクピリチオン処理液*1 (5)	10	10	10
カチナールLC200*2 (6)	0.5	−	0.5
水 (7) (11)	(10) バランス	(10) バランス	(10) バランス
評価 コンディショニング効果 (12)	○	△	△
評価 安定性 (13)	○	×	△

*1: 1% Zinc pyrithione; 1% Popearl PA-10 (Shin-Etsu Kagaku Kogyo Inc.); 8% water.

*2: Tobo Kagaku, Inc.

Key: (1) Ingredient, (2) Poly(oxyethylene) (3 E.O.) sodium lauryl sulfate salt, (3) Coconut oil fatty acid diethanolamide, (4) Dimethylpolysiloxane (100,000 cs), (5) Zinc pyrithione treatment solution*1, (6) Catinal LC200*2, (7) Water, (8) Application Example, (9) Comparative Example, (10) Balance, (11) Evaluation, (12) Conditioning effect, (13) Stability

[0058]

Application Example 2

Shampoo composition

A shampoo was prepared by uniformly mixing the following ingredients.

	Wt%
(1) Poly(oxyethylene) lauryl sulfosuccinate disodium salt (3 E.O.)	10
(2) Sodium N-lauroyl methyltaurine	5
(3) Laurylamine oxide	3
(4) Dimethyl polysiloxane (made by Shin-Etsu Kagaku Kogyo, Inc.; Dimethicone; 100,000 cs)	3
(5) Selenium disulfide	1
(6) Cationic cellulose (made by Union Carbide, Inc.; Polymer JR400)	0.2
(7) Ethylene glycol distearate	2
(8) Methylparaben	0.2
(9) Fragrance	Suitable amount
(10) Dye	Suitable amount
(11) Water	Balance

[0059]

Application Example 3

Shampoo composition

A shampoo was prepared by uniformly mixing the following ingredients.

	Wt%
(1) Lauryl sulfate triethanolamine	10
(2) Capryl glucoside	5
(3) Coconut oil fatty acid monoethanolamide	2
(4) Methylphenylsilicone (100,000 cs)	3
(5) Zinc pyrithione	1
(6) Cationic guaiac gum (JAGUR C13S made by Meihol Chemical Inc.)	0.2
(7) Fragrance	Suitable amount
(8) Dye	Suitable amount
(9) Water	Balance

[0060]

Effects of the invention

According to the detergent composition of the present invention, silicone oil and microparticles, which are insoluble in water and exhibit a large difference in their specific weights, are dispersed in a stable manner, and excellent conditioning effects can be achieved.